Paul A. Mathew

Lawrence Berkeley National Laboratory
1 Cyclotron Road, MS:90-3074, Berkeley CA 94720

510 486 5116
PAMathew@lbl.gov

Experience

Lawrence Berkeley National Laboratory

Staff Scientist, Environmental Energy Technologies Division (March 2002 – present)

Department Head, Whole Building Systems

Energy Benchmarking and Analysis: DOE Buildings Performance Database (PI) ♦ Building Energy Data Exchange Specification (PI) ♦ EnergyIQ action-oriented benchmarking tool for California Energy Commission (co-PI) ♦ Energy management systems for commercial buildings ♦ DC Pro Data Center assessment tools. ♦ Labs21 tool for benchmarking laboratories (PI).

Energy Efficiency Financing: Incorporating efficiency metrics in commercial mortgage valuation (PI) ♦ Risk analysis methods for savings uncertainty in federal ESPC projects.

High Performance Buildings: FLEXLAB testing of integrated building systems ♦ Technical lead for Better Buildings Alliance Laboratories Team ♦ Technical lead for Labs21 Environmental Performance Criteria "LEED for Labs" ♦ Instructor for lab design courses ♦ Best practice guides ♦ Technical assistance for sustainable design projects.

Visioning and Strategic Planning: White paper on Guaranteed Performance in commercial buildings ♦ Action plan for achieving zero-energy commercial buildings ♦ Action plan for benchmarking program for India ♦ Business planning for Standard Energy Efficiency Data (SEED) Platform

Enron Energy Services

Manager, Energy Asset Management (August 2000 – December 2001)

Deal Pricing: Development and use of statistical techniques and models to value large portfolios of energy efficiency projects ♦ Used models in pricing commercial and industrial energy efficiency deals worth over $20 Million.

Business Process Development: Received "Power Player" management award for creating business processes and tools to support scaleable, portfolio-based pricing of energy efficiency projects ♦ Worked with sales and engineering groups to advocate, disseminate, and implement new business processes and tools for scaleable pricing.

Center for Building Performance Carnegie Mellon University

Research Scientist (May 1996 – July 2000)

Building Performance Research and Consulting: Collaborated with industry, government and consultants on development of "Intelligent Buildings"♦ Over 8 years experience using **DOE-2** for detailed energy analysis ♦ Conducted occupancy evaluations and field diagnostics of indoor thermal, lighting and air quality.

Simulation Tools Development: Designed and implemented CAD-integrated simulation tool for collaborative building design and energy simulation ♦ Used case tools for developing object-oriented software systems.

Education and Training: Conducted professional seminars on high-performance building design ♦ Developed and taught graduate course in energy simulation ♦ Supervised graduate and undergraduate student projects.

Education

Ph.D. in Building Performance and Diagnostics. May 1996.
Carnegie Mellon University
Thesis: Integrated Energy Modeling for Computational Building Design Assistance

Master of Science in Building Performance and Diagnostics. December 1990.
Carnegie Mellon University

Bachelor of Architecture. Mangalore University, India. 1989.

Selected Publications

Over 100 publications in total including archival journal papers, conference papers, trade publication articles and technical reports.

Journal Papers

Mathew, P., Dunn, L., Sohn, M., Mercado, A., Custodio, C., Walter, T. 2014. Big-data for building energy performance: Lessons from assembling a very large national database of building energy use. *Applied Energy* 140 (2015) 85-93.

Mills, E., P. Mathew, 2014. "Monitoring-based Commissioning: Benchmarking analysis of 24 university buildings in California." *Energy Engineering*. Vol. 111, No. 4. LBNL-5891E.

Wang, L., Mathew, P., Pang, X. 2012. "Uncertainties in Energy Consumption Introduced by Building Operations and Weather for a Medium-Size Office Building." Energy and Buildings 53 (2012) 152–158.

Coffey, B., S. Borgeson, J. Apte, S. Selkowitz, P. Mathew, P. Haves. "Towards a very low energy building stock: modeling the US commercial building sector to support policy and innovation planning," *Building Research & Information*. 37:5,610 — 624.

Mathew, P., S. Greenberg, S. Ganguly, D. Sartor, W. Tschudi. "How Does Your Data Center Measure Up? Energy Efficiency Metrics and Benchmarks for Data Center Infrastructure Systems," *HPAC Engineering*, May 2009.

Mathew, P., E. Mills, N. Bourassa, M. Brook. "Action-Oriented Benchmarking: Using the CEUS Database to Benchmark Commercial Buildings in California." *Energy Engineering. Volume 105, Number 5/2008.* LBNL-502E

Mathew, P., D. Sartor, G. Bell, D. Drummond. "Major Energy Efficiency Opportunities in Laboratories – Implications for Health and Safety," *Journal of Chemical Health and Safety*, Vol. 14, No. 5, September/October 2007.

Mathew, P., E. Koehling, S. Kumar. "Use of Quantitative Uncertainty Analysis to Support M&V Decisions in ESPCs," *Energy Engineering*. Vol 103, Number 2, pp. 25-39, February 2006.

Mathew, P., J.S. Kromer, O. Sezgen, S. Meyers. "Actuarial Pricing of Energy Efficiency Projects: Lessons Foul and Fair," *Energy Policy* Vol 33/10 pp 1319-1328.

Mills, E., J.S. Kromer, G. Weiss, P. Mathew. "From volatility to value: analysing and managing financial and performance risk in energy savings projects." *Energy Policy*, 34 (2006) 188–199.

Conference Papers

Mathew, P., N. Wallace, E. Alschuler, L. Kolstand, 2016. Commercial mortgages: An underutilized channel for scaling energy efficiency investments? ACEEE Summer Study on Energy Efficiency in Buildings. August 2016. American Council for an Energy Efficient Economy.

Mathew, P., R. Clear, K. Kircher, T. Webster, K.H.Lee, T. Hoyt. "Advanced Benchmarking for Complex Building Types: Laboratories as an Exemplar," Proceedings of the 2010 ACEEE Summer Study of Energy Efficiency in Buildings. ACEEE, Washington, D.C.

Selkowitz, S., J. Granderson, P. Haves, P. Mathew, J. Harris. "Scale Matters: An Action Plan for Realizing Sector-Wide "Zero-Energy" Performance Goals in Commercial Buildings," Proceedings of the 2008 ACEEE Summer Study of Energy Efficiency in Buildings. ACEEE, Washington, D.C.

Mathew, P., D. Sartor, O. van Geet, S. Reilly. "Rating energy efficiency and sustainability in laboratories: Results and lessons from the Labs21 program," Proceedings of the 2004 ACEEE Summer Study of Energy Efficiency in Buildings. ACEEE, Washington, D.C.

Awards

Presidential Award for Leadership in Federal Energy Management (2007)

Awarded for Labs21 program achievements

Power Player Award, Enron Energy Services (2001)

Awarded for developing business process and tools for scalable pricing of energy projects